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# One-step Facile Functionalization of Graphene for Highly Active Electrocatalysis

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Prussian blue (PB) as a non-enzymatic catalyst, has been widely used in chemical and biological sensor function[1]. Graphene-based materials have captured great interest among physicists, chemists and materials scientists. Graphene is a two-dimensional (2-D) sheet of carbon atoms in a hexagonal configuration with atoms bonded by $sp^2$ bonds. This unique nanostructure holds great promise for potential applications in technological fields such as nanoelectronics, sensors, nanocomposites and capacitors[2]. In the present work, we reportfabrication of high-quality PB nanocube/graphene hybrid materials using $K_4[Fe(CN)_6]$ as the sole iron source for both reduction and functionalization of GO in one step. The hybrid material was characterized by Uv-vis, XRD and Raman spectroscopy, SEM, TEM and electrochemistry, PB nanocubes can be prepared by this method due to the slow crystal growth process. High-quality PB nanocubes display a low zeolite water content and a small number of $[Fe(CN)_6]$ vacancies in the crystal framework. This results in impressive electrochemical performance and high conductivity. High-quality PB nanocubes are easily combined with graphene into stable and highly uniform distribution by chemical bonding and were found to display high performance in electrocatalytic reduction of $H_2O_2$.

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Reference

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